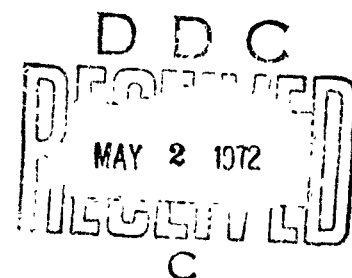


Report No.
FAA-NO-70-17

Final Report

Contract No. DOT-FA-70WA-2254
Project No. 253-011

ENVIRONMENTAL INFLUENCE ON PUBLIC RESPONSE TO THE SONIC BOOM



Prepared for

FEDERAL AVIATION ADMINISTRATION
Sonic Boom Program Staff

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TRACOR, INC.
Austin, Texas

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This report has been prepared by TRACOR, Inc., for the Sonic Boom Program Staff, Federal Aviation Administration, under Contract No. DOT-FA-70WA-2254. The contents of this report reflect the views of the contractor, who is responsible for the facts and the accuracy of the data presented herein, and do not necessarily reflect the official views or policy of the FAA. This report does not constitute a standard, specification or regulation.

TRACOR, INC.

AUSTIN, TEXAS

ABSTRACT

Previous studies of public response to the sonic boom have not considered reactions to the boom within the context of the city or neighborhood environment. Data from contract NASW-1704 ("Public Reactions to Sonic Booms") are combined with data from contract NASW-1549 ("Community Reaction to Airport Noise") in order to study the effect of environmental conditions, both physical and social, on response to the boom. Data from both contracts are similar in nature.

The specific environmental conditions are (1) exposure to subsonic aircraft noise, (2) urbanization, (3) traffic noise, (4) neighborhood cohesiveness, and (5) the extent of complaint about the boom in the neighborhood. Response to the boom is viewed in two manners: (1) a subjective reaction which is a result of the boom, e.g., annoyance or the disturbance of activities; and (2) an attitudinal response, i.e., the ideas about the boom which the respondent has developed prior to any specific exposure to booms.

Results show that subjective reactions to the boom are subordinated to reactions to subsonic aircraft noise for those respondents who are regularly exposed to airport noise. Those not regularly exposed show a strong subjective reaction to the sonic boom.

Attitudinal response is affected by the respondent's environment. Response to the conditions of urbanization and neighborhood cohesiveness depend upon the type of measure used for each concept. Traffic noise has no effect on responses. Noncomplainants' attitudes are strongly affected by the extent of complaint, whereas complainants' attitudes are not.

FOREWORD

This report is based upon a secondary analysis performed by TRACOR, Incorporated, under contract DOT-FA70WA-2164 for the Office of Noise Abatement, Federal Aviation Administration.

TRACOR has recently completed a study of public response to sonic booms. The purposes of this study were to assess the nature of response to the sonic boom and to identify the social or psychological factors associated with this response. The results of this study were reported in "Public Reactions to Sonic Booms," NASA CR-1665, National Aeronautics and Space Administration, September, 1970.

In an effort to learn more about response to the sonic boom, TRACOR proposed to re-examine the data from the above completed sonic boom study in relation to new data. These new data are environmental conditions in which the response to the boom occurs. Some of the data were derived from census publications, some from local statistics, and other from a study (previously conducted by TRACOR) of community reaction to airport noise (subsonic aircraft noise). These latter data are appropriate for use because of the close correspondence between the airport noise study and the sonic boom study. They were conducted in the same cities, using the same field office supervision, the same interviewers and similar interview schedules. This close correspondence permitted the combining of the two sets of data for the analysis in this report.

Since this report is an extension of two previous reports the contributions of many individuals cannot be included. Dr. Wayne Rudmose was Program Manager; Dr. William R. Hazard was Project Director; and Mr. Harrold P. Patterson was in charge of the analysis of data and writing the report.

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INTRODUCTION

Objectives

Previous studies of community reactions to subsonic and supersonic aircraft noise have recently been conducted by TRACOR, Inc., under contracts NASW-1549 and NASW-1704, in collaboration with the National Aeronautics and Space Administration and the Federal Aviation Administration. Contract NASW-1549 was a comprehensive study of public reactions to subsonic aircraft noise in selected areas around seven major airports in the United States. Contract NASW-1704 was a two-phase study of public reactions to the sonic boom and involved the collecting of data both before and after a series of Air Force SR-71 training flights in six metropolitan areas of the United States.

The aircraft noise study had as its major objective the determination of the limits of tolerance for noise produced by civil jet aircraft operating at large airports. During this study, approximately 8,000 interviews were obtained. The results and conclusions are presented in the report, "Community Reaction to Airport Noise."¹

The sonic boom study had as its objectives the assessment of the nature of public response to sonic booms and the identification of the major social or psychological factors associated with this response. Over 6,000 personal interviews were conducted in order to obtain this information. Results and conclusions can be found in the report, "Public Reactions to Sonic Booms."²

The sonic boom study did not have as one of its tasks the study of data from the two separate studies to determine whether respondents who live near the airport and are exposed to subsonic aircraft noise react differently to sonic booms when compared to respondents who live far from the airport and who thus have a minimal exposure to subsonic aircraft noise.

In addition, the original boom study proposal did not call for an investigation of the effects of the characteristics of the area in which the respondent lives, such as the degree of urbanization, the residential stability of the area, the degree

¹"Community Reaction to Airport Noise," Vol. I - NASA CR-1761, Vol. II - NASA CR-111316, National Aeronautics and Space Administration, September, 1970.

²"Public Reactions to Sonic Booms," NASA CR-1665, National Aeronautics and Space Administration, September, 1970.

of neighborhood cohesiveness, the amount of traffic noise and the pervasiveness of complaint, as related to the reactions and attitudes of the respondent toward the sonic boom. This "add-on" study was undertaken to explore these two additional areas. For the purposes of this analysis no additional interviews were conducted. All data used for this report were available from the two studies mentioned above.

Two different types of response to sonic booms have been suggested.³ The first deals with the subjective response which results from being exposed to sonic booms. This response measured in terms of such things as annoyance and the disturbance of everyday activities. The second response refers to the attitudinal "set" which the person exposed to sonic booms has already developed prior to the particular exposure event. Both types of response are important and are used in the analysis which follows.

Purpose

The purpose of this add-on analysis is to examine specifically the influence of neighborhood or city environments on public response to the sonic boom.

The discussion of this analysis is divided into two parts. Part I examines subjective response and some attitudinal response to the sonic booms before, during and after the SR-71 flights in terms of regularity of exposure to subsonic aircraft noise. Data collected in Los Angeles, California, for the aircraft noise study and the sonic boom study are combined for this analysis. Part II identifies the specific environmental conditions of urbanization, traffic noise, neighborhood cohesiveness and the "climate" of complaint in the neighborhood and examines the effects of these factors on the attitudinal response to sonic booms after the SR-71 flights in terms of regularity of exposure to subsonic aircraft and, in addition, in terms of the complainant/noncomplainant status of the respondent. Data from the sonic boom study alone, including respondents in all cities, are used for this part of the analysis.

The research question for Part I is: "What is the effect of subsonic aircraft noise exposure on subjective response to the boom?"

Part II addresses the question "Is the attitudinal response to the sonic boom strictly an individual effect or is this response contingent upon the context of the social and/or physical environment in which the individual lives and experiences the boom?"

³See Chapter III, "Public Reactions to Sonic Booms."

Results

The results of Part I and Part II can be summarized as follows:

(A) Part I

(1) For those exposed regularly to subsonic aircraft noise:

(a) The increase in annoyance with the boom from before to during SR-71 flights is small (only eight percentage points).

(b) Something other than the boom is chosen more often as the most annoying sound in the neighborhood, both before and during SR-71 flights, although the increase in the percent who do is about fourfold.

(c) Only moderate startle is evident (less than 20 percent report much or very much startle), but resultant annoyance is high. Startle and resultant annoyance are stable from before to during SR-71 flights.

(d) Annoyance with sonic booms is always subordinate to annoyance with subsonic aircraft noise.

(2) For those not exposed regularly to subsonic aircraft noise:

(a) The percent who are annoyed with the boom from before to during SR-71 flights is almost doubled (24 to 44 percent).

(b) As with those exposed regularly to airport noise, something other than the boom is chosen more often as the most annoying sound in the neighborhood, both before and during booms. Although for this group the increase is also about fourfold, the percents are somewhat larger for both time periods than the percents for those exposed regularly.

(c) Very little startle (10 percent or less are much or very much startle) and little resultant annoyance are evident.⁴ Both are stable from before to during SR-71 flights.

⁴This refers to those who report "high" startle on the opinion thermometer (3 and 4 on a 0-4 scale). This is in spite of the fact that "startle" was the most frequently used adjective to describe the boom in subsequent interviewing.

(d) The sonic boom moves from a moderate source of annoyance to the prime source of annoyance from before to during SR-71 flights.

(3) Five months after SR-71 flights:

(a) Those exposed regularly to airport noise:

- (1) Object more to the boom,
- (2) Choose subsonic aircraft noise as the first sound to eliminate,
- (3) Are more negative in describing it, and
- (4) Report more disturbance of activities than those not exposed regularly to airport noise (noncomplainers especially).

(b) Those not exposed regularly to airport noise:

- (1) Object less to the boom,
- (2) Choose the sonic boom as the first sound to eliminate,
- (3) Are less negative in describing it, and
- (4) Report less disturbance of activities than those exposed regularly.

(B) Part II

(1) The effects of urbanization operate toward the boom differentially:

(a) Complainant negative attitudes increase as family size increases, as the proportion of working women decreases, and as the extent of social isolation increases.

(b) Noncomplainant negative attitudes toward the boom decrease as family size increases, are not affected by the proportion of working women, and increase as the extent of social isolation increases.

(2) Traffic noise has no effect on negative attitudes toward the boom.

(3) Negative attitudes toward the boom increase as the residential stability of an area decreases.

(4) Negative attitudes toward the boom increase as the extent of home ownership increases--especially for complainants.

(5) No effect on attitudes toward the boom is found for complainants as the number of complaints in an area increases.

(6) Negative attitudes of noncomplainants toward the boom increase as the number of complaints in an area increases.

PART I: THE EFFECT OF SUBSONIC AIRCRAFT NOISE

Before and During SR-71 Flights

(A) Sample. Table I shows the data collection schedules for the aircraft noise and the sonic boom studies by city. In only one city, Los Angeles, are there data before, during, and after SR-71 flights. For this reason, Part I of this report will concern itself solely with Los Angeles data.

In general, the aircraft noise sample and the sonic boom sample were both area probability samples stratified by certain socioeconomic variables. The sampling universe of the aircraft noise study consists of those people within fifteen miles of Los Angeles International Airport who are under the takeoff and landing patterns. The sampling universe for Phase I of the sonic boom study consisted of all persons exposed to the SR-71 flights. The sample for Phase II of the sonic boom study was a combination of complainants, noncomplainants, and people previously interviewed in Phase I. The reports mentioned earlier should be consulted about specific sampling procedures.

Although the SR-71 flights began in Los Angeles on July 10, 1967, interviewing in this area for the aircraft noise study began in May of 1967. The aircraft noise interviews were conducted May through July, 1967. The sonic boom Phase I interviews were conducted June through July, 1967. An inspection of the interviewing dates showed that the interviewing in Los Angeles could be divided into "before" (May-July 9, 1967) and "during" (July 10-29, 1967) the occurrence of SR-71 flights.

Table II shows the data collection schedule for Los Angeles broken down into these specific time periods and into another basic division: "Near" and "Far." These two labels divide the samples into two basic groups: (1) those who live close enough to Los Angeles International Airport to be affected regularly by its operations, and (2) those who live far enough away not to be affected regularly by its operations. The division of the sample was accomplished by locating each census tract in which interviews were collected and then making a line which would roughly divide the interviews into Near and Far. Figure 1 shows how the census tracts were divided. Any census tract above the upper line or below the lower line was considered "Far" from the airport. The same demarcation lines were used to divide the sample for Phase II of the sonic boom study.

Several features of Table II are worth emphasizing. There are, of course, no census tracts from the aircraft noise study which fall outside the demarcation lines. All data relating to "Far" from the airport are from the sonic boom study.

Table I

DATA COLLECTION SCHEDULES

AIRCRAFT NOISE (NASW-1549) AND SONIC BOOM (NASW-1704) STUDIES

BY CITIES

| | May-July, 1967 | | June-July, 1967 | | Feb.-April, 1968 | |
|----------------------|---------------------------|-----------------------|-----------------------|-----------------------|------------------------|--|
| | Aircraft Noise Phase I | Sonic Boom Phase I | Sonic Boom Phase I | Sonic Boom Phase I | Sonic Boom Phase II | |
| Atlanta | ---- | 1018 | ----- | ----- | 87 | |
| Dallas/Ft. Worth | 923 | 860 | ----- | ----- | 194 | |
| Denver | 1009 | 908 | ----- | ----- | 146 | |
| Chicago | 872 | 980 | 84 | ----- | ----- | |
| Los Angeles | 786 | 339 | 246 | 592 | ----- | |
| Minneapolis/St. Paul | ---- | 900 | 1 | ----- | ----- | |
| TOTALS | 3590 | 5005 | 351 | 1014 | | |

COUNTY OF LOS ANGELES LOS ANGELES, CALIFORNIA

SEE INSERT MAP FOR NORTHERN PART OF COUNTY

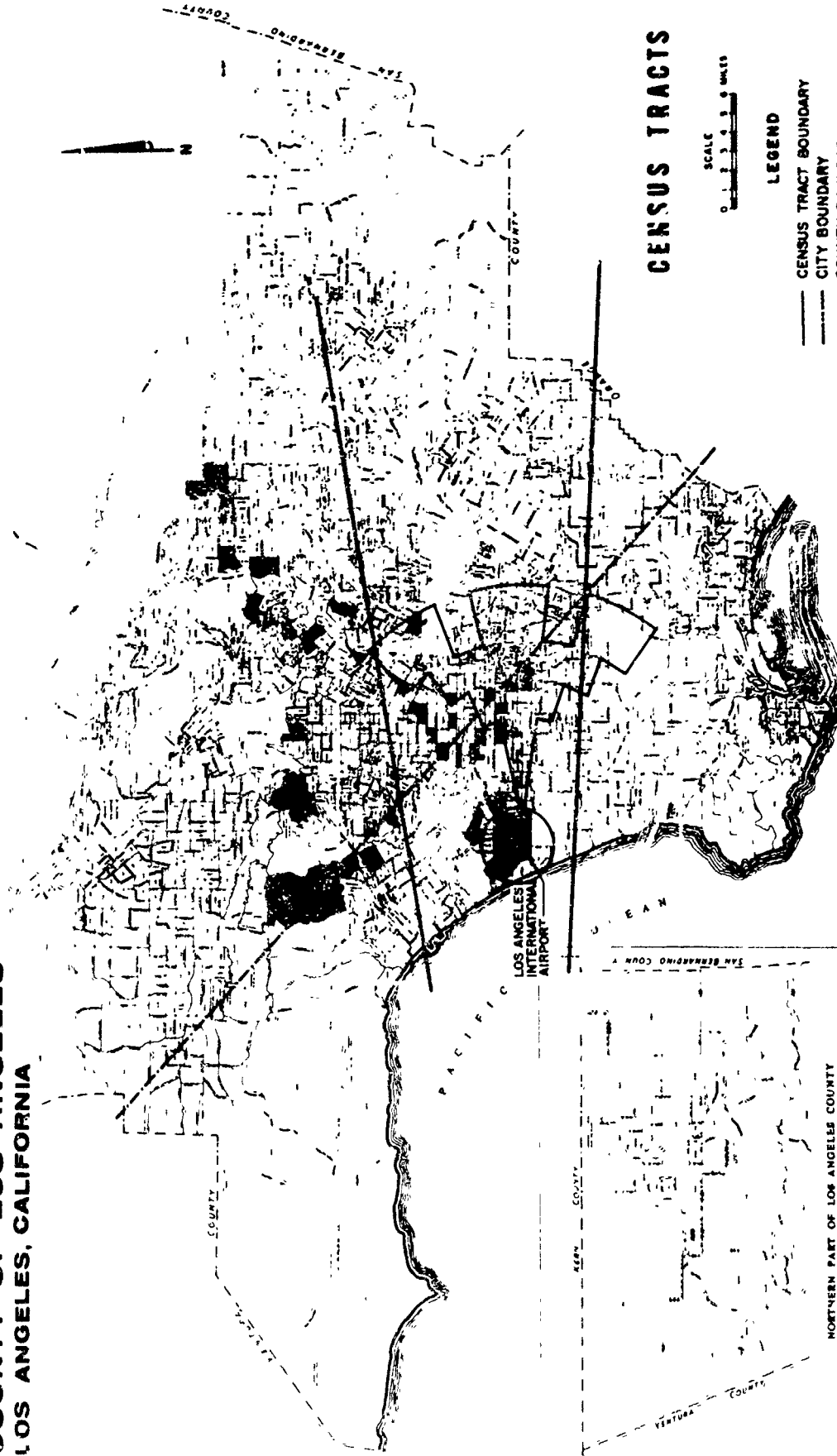


FIGURE 1
SR-71 BOOM PATHS AND SAMPLING TRACTS
(SONIC BOOM PHASE I AND AIRCRAFT NOISE PHASE I)

Table II
INTERVIEWS COLLECTED IN LOS ANGELES

| | Near | | Far | |
|----------------|--------|--------|--------|--------|
| | Before | During | Before | During |
| Aircraft Noise | | | | |
| Phase I | 678 | 108 | 0 | 0 |
| Sonic Boom | | | | |
| Phase I | 147 | 159 | 92 | 102 |
| Totals | 825 | 267 | 92 | 102 |

| | Near | Far |
|------------|------|-----|
| Sonic Boom | | |
| Phase II | 183 | 354 |

(B) Method. The similarity between the interview schedules for the aircraft noise study and Phase I of the sonic boom study greatly facilitates the analysis. The interview schedule for Phase II of the sonic boom study is entirely different from the others,¹ and direct comparison with the previous schedules is not possible.

The analysis of Part I will be in two sub-sections. The first section will consider data from the aircraft noise study and Phase I of the sonic boom study combined. These data will be analyzed in terms of how the respondents react when asked how they would feel if sonic booms occurred in their area, the degree of annoyance with the boom, the most annoying sound in the neighborhood, degree of startle from the boom and the resultant annoyance, ratings of various neighborhood qualities, hearing the boom in the context of other neighborhood sounds and the accompanying annoyances, and the effect of aircraft noise on subjective response to the boom. The second section of the

¹See Appendix A, "Public Reactions to Sonic Booms."

analysis will consider data from Phase II of the sonic boom study. These data will be analyzed in terms of the extent of objection to the boom, the number of activities disturbed by the boom, the negative attitudinal position (toward the boom) of the respondents, whether the boom is selected as the first sound to eliminate, ratings of various neighborhood qualities, and the effect of exposure to aircraft noise on attitudes toward the boom. The main concern of this part of the analysis is to examine changes in subjective responses and attitudinal positions over the time periods outlined above within the context of regular or nonregular exposure to subsonic aircraft noise.

(C) Results.

(1) Feelings About the Boom. Table III shows responses to the question: "How do you think you might feel if there were sonic booms around here?" This is a very unstructured question and answers were categorized into the general areas of "negative," "positive or indifferent," and "other."

Table III

RESPONSE TO THE QUESTION:
"HOW DO YOU THINK YOU MIGHT FEEL IF
THERE WERE SONIC BOOMS AROUND HERE?"

(In Percent)

| | Near | | Far | |
|----------------------------|--------|--------|--------|--------|
| | Before | During | Before | During |
| Negative | 77 | 76 | 76 | 67 |
| Positive or Indifferent | 21 | 21 | 20 | 31 |
| Other | 2 | 3 | 3 | 2 |
| (Number of Respondents) | (750) | (267) | (90) | (104) |

At all times among all groups the answers are strongly negative. For those near the airport there is little change in attitude from before to during the SR-71 flights. For those far from the airport there is a drop of about 10 percent from before to during flights. If we use the percent of those who are negative before the flights as a base number which reflects the respondents' anticipated responses, then we can say that those near the airport had their anticipations fulfilled, while those far from the airport found their previous estimation too severe.

(2) Annoyance With the Boom. Table IV shows the extent of annoyance with the boom. For both groups, those Near and Far from the airport, a substantial rise in annoyance occurs. The rise for those far from the airport is much more dramatic. During booms it is almost twice as much as it was before the flights began. Those near the airport are more highly annoyed than those far away before the flights, but less so during the flights.

Table IV

ANNOYANCE WITH THE BOOM

(In Percent)

| | Near | | Far | |
|-------------------------|--------|--------|--------|--------|
| | Before | During | Before | During |
| High (3-4) | 30 | 38 | 24 | 44 |
| Low (0-2) | 70 | 62 | 76 | 56 |
| (Number of Respondents) | (664) | (234) | (72) | (98) |

Table V shows that from before to during flights there is about a fourfold increase in the percent who chose the boom as the most annoying sound in the neighborhood. Although percentages for those far from the airport are higher than for those near the airport, the rate of increase is about the same for both groups. Before the flights those far from the airport chose the boom as most annoying slightly more than those close to the airport. During the flights this difference is more substantial. It should be noted, however, that a minority of the respondents choose the boom in all categories.

Table V
MOST ANNOYING SOUND^{*}
(In Percent)

| | Near | | Far | |
|-------------------------|--------|--------|--------|--------|
| | Before | During | Before | During |
| Boom | 6 | 22 | 8 | 30 |
| Other | 94 | 78 | 92 | 70 |
| (Number of Respondents) | (147) | (161) | (92) | (105) |

* Asked only for Phase I of the sonic boom study

(3) Startle and Its Consequences. Tables VI-A and VI-B present the extent of startle and the resultant annoyance. The numbers in brackets are the sums of the figures found in the last two rows of each column and are included for ease of analysis.

On the surface, it is quite evident that those near the airport are more startled than those far from the airport, even though the extent of startle is not great. However, the question about startle failed to distinguish between startle from subsonic aircraft and startle from supersonic aircraft. The data in these two tables must, therefore, be interpreted with caution. Much of the response from those near the airport probably includes reactions to subsonic aircraft.

The first row of Table VI-A reveals that a large number of respondents were not startled at all. If this group were combined with those who were startled only a "Little" (the second row), then three-fourths to two-thirds of each column would be included. Those near the airport show more "high" startle than those far away, as shown by the bracketed figures.

The reactions of those near the airport remain about the same from before to during the flights. Those far from the airport show a slight drop during these periods.

Table VI-A

HOW OFTEN WOULD YOU SAY PLANES STARTLE YOU WHEN THEY FLY OVER?

(In Percent)

| | Near | | Far | |
|-------------------------|------------|------------|-----------|----------|
| | Before | During | Before | During |
| None - 0 | 40 | 38 | 50 | 58 |
| Little - 1 | 25 | 25 | 29 | 19 |
| Some - 2 | 18 | 18 | 11 | 18 |
| Much - 3 | 10 [17] | 13 [18] | 8 [10] | 4 [6] |
| Very much - 4 | 7 | 5 | 2 | 2 |
| (Number of Respondents) | (697) | (222) | (90) | (102) |

These data show that startle does not appear to be a salient issue for these respondents. If we look only at those respondents who live far from the airport where the effects of subsonic aircraft are less intense, we find that a very small percent (10 or less) report more than "Some" startle.

In Table VI-B the amount of annoyance to the startle is presented. The amount of annoyance was asked only of those who expressed "Little" or more startle. Those who were not startled were excluded. The figures in brackets are the sums of those who rated their annoyance "Much" or "Very Much" and represent the percent who are highly annoyed.

The bracketed percents show that half of those near the airport and who are startled are highly annoyed. Only a third of those far from the airport who are startled react in the same manner.

For both groups (Near and Far) annoyance reactions are very stable from before to during the flights. Not more than one percentage point separates the groups who are highly annoyed during these periods.

Table VI-B

WHEN PLANES STARTLE, PLEASE TELL ME HOW MUCH YOU FEEL ANNOYED?

(In Percent)

| | Near | | Far | |
|-------------------------|---------|---------|---------|--------|
| | Before | During | Before | During |
| None - 0 | 10 | 10 | 20 | 7 |
| Little - 1 | 21 | 20 | 24 | 35 |
| Some - 2 | 18 | 20 | 27 | 28 |
| Much - 3 | 20 | 26 | 13 | 21 |
| Very much - 4 | 30 [50] | 24 [50] | 16 [29] | 9 [30] |
| (Number of Respondents) | (438) | (144) | (45) | (43) |

(4) The Boom and Other Neighborhood Sounds. The context in which the boom is perceived is illustrated in Tables VII and VIII. The former table shows the percent who are highly annoyed by each neighborhood sound listed; the latter shows the rank order of the sounds by annoyance. Several summary measures are placed at the bottom of Table VII. The number of increases, decreases, and no changes is a count of whether the percents in each "During" column is different (by 2 or more percent) from the respective percent in the preceding "Before" column. No overall average percent was calculated for each column since the total number of sounds heard in different neighborhoods could vary widely.

Table VII shows that the overall trend is for a reduction in high annoyance for both groups from before to during flights. There are several important exceptions. For those near the airport every item either decreases or does not change except for sonic booms, for which there is a rise in the percent who are highly annoyed (30 to 38). For those far from the airport high annoyance with every item either decreases or remains unchanged except for sonic booms and aircraft. The rise in percent who are highly annoyed with the boom is almost double (24 to 44) for this group.

Table VII
PERCENT HIGHLY ANNOYED* BY EACH NEIGHBORHOOD SOUND LISTED

| | Near | | Far | |
|---------------------------------|---------|---------|--------|--------|
| | Before | During | Before | During |
| Trucks/Autos | 33 | 25 | 41 | 29 |
| Aircraft | 62 | 52 | 12 | 18 |
| Neighborhood Children | 24 | 24 | 22 | 13 |
| Dogs, other pets | 23 | 19 | 31 | 27 |
| People | 15 | 14 | 10 | 10 |
| Motorcycles (Motorbikes) | 37 | 29 | 35 | 33 |
| Trains | 7 | 7 | 3 | 4 |
| Sirens | 26 | 18 | 30 | 19 |
| Construction | 8 | 4 | 8 | 2 |
| Lawn Mowers, garbage collection | 14 | 8 | 3 | 3 |
| Sonic Booms | 30 | 38 | 24 | 44 |
| Range in No. of Respondents | 237-780 | 158-253 | 31-86 | 75-100 |
| Number of Increases** | | 1 | | 2 |
| Number of Decreases** | | 7 | | 6 |
| Number of No Changes | | 3 | | 3 |

* Those who choose 3 or 4 on a 0-4 scale.

** A difference of more than one percent is required.

These data in Table VII show that the reaction to the flights is much more intense in areas where there is little regular exposure to subsonic aircraft. In areas where there is regular exposure a rise in annoyance with the boom is seen but not as severe.

Another way of stressing the differential reaction to the boom is presented in Table VIII, where the percents from Table VII are rank ordered. In this table we see that subsonic aircraft remain the chief source of annoyance to those near the airport. Sonic booms do, however, move up to second place (from fourth) after the beginning of SR-71 flights. For those far from the airport, traffic noise from trucks and autos is replaced by the sonic boom as the chief source of annoyance from before to during the flights. The sonic boom makes a considerable leap from fifth to first place between the two time periods.

These data illustrate that the sonic boom is subordinate to the subsonic aircraft noise among those respondents who live near the airport. On the other hand, the sonic boom emerges as the prime source of annoyance among those respondents who live far from the airport. Evidently, this annoyance also affects annoyance with aircraft in general for this group.

(5) Neighborhood Ratings. Previous research has always felt that one possible expression of irritation with environmental noise is a changed feeling about the desirability of living in a certain area. Thus, if a person's irritation or annoyance with the boom is strong enough, his attitude concerning his neighborhood environment may be affected. Typically, his attitude has been measured by asking him to "rate" various neighborhood qualities.

TRACOR, Inc., has examined this idea in both the aircraft noise study and the sonic boom study. In both the consensus is that ratings of neighborhood qualities have not proven to be a very important variable in the prediction or explanation of response to subsonic aircraft noise or sonic booms.

In spite of the negative results previously obtained, this variable was again examined for this analysis. The relevant information is presented in Table IX.

On the surface, the analytic patterns in this table appear obvious. For both groups and for both time periods the average percent who rate the neighborhood favorable is never less than 64 percent. Those near the airport show more increasing percents than decreasing percents, indicating a change toward a more favorable view of the neighborhood. Those far from the airport show more decreasing percents than increasing ones, indicating a change toward a less favorable view of the neighborhood.

Table VIII
RANK ORDER OF NEIGHBORHOOD SOUNDS ACCORDING TO
PERCENT HIGHLY ANNOYED

| | Near | | Far | |
|------------------------------------|--------|--------|--------|--------|
| | Before | During | Before | During |
| Trucks/Autos | 3 | 4 | 1 | 3 |
| Aircraft | 1 | 1 | 7 | 6 |
| Neighborhood Children | 6 | 5 | 6 | 7 |
| Dogs, other pets | 7 | 6 | 3 | 4 |
| People | 8 | 8 | 8 | 8 |
| Motorcycles (Hotrods) | 2 | 3 | 2 | 2 |
| Trains | 11 | 10 | 10* | 9 |
| Sirens | 5 | 7 | 4 | 5 |
| Construction | 10 | 11 | 9 | 11 |
| Lawn Mowers, garbage collection | 9 | 9 | 10* | 10 |
| Sonic Booms | 4 | 2 | 5 | 1 |

*Tie

Table IX
PERCENT REPORTING EACH NEIGHBORHOOD QUALITY
LISTED AS FAVORABLE*

| | Near | | Far | |
|-----------------------------------|---------|---------|--------|--------|
| | Before | During | Before | During |
| Economic Advantages | 54 | 42 | 28 | 42 |
| Convenience | 82 | 82 | 92 | 82 |
| Community Facilities | 77 | 75 | 76 | 65 |
| Quietness of Area | 37 | 39 | 64 | 67 |
| Traffic | 39 | 46 | 49 | 46 |
| Safety of Children | 53 | 59 | 66 | 60 |
| Spacious yards/privacy | 60 | 64 | 66 | 61 |
| Neighbors | 78 | 81 | 86 | 80 |
| Neighborhood Appearance | 74 | 78 | 96 | 76 |
| Safety at Night | 53 | 53 | 68 | 59 |
| Nearness of Schools | 83 | 87 | 74 | 74 |
| Nearness of Public Recreation | 67 | 66 | 54 | 62 |
| Nearness of Public Transportation | 71 | 64 | 52 | 65 |
| Nearness of Highways | 69 | 67 | 69 | 60 |
| Preference for certain house | 72 | 77 | 81 | 72 |
| Zoning | 65 | 71 | 75 | 73 |
| Local Government | 60 | 55 | 51 | 66 |
| Overall Average Percent | 64 | 65 | 68 | 65 |
| Range in No. of Respondents | 756-823 | 254-266 | 78-91 | 97-101 |
| Number of Increases** | | 9 | | 5 |
| Number of Decreases** | | 5 | | 10 |
| Number of No Changes | | 3 | | 2 |

*Rating an item 4 or 5 on a 1 to 5 scale.

**A difference of two or more percent is required.

These data would seem to indicate that the onset of SR-71 flights is associated with these changes. However, several problems are inherent in the data.

First, we have no way of knowing, without a control group, what kinds of changes would have taken place without the presence of the SR-71 flights. For example, we have no explanation for the apparent increase in favorableness of neighborhoods for those near the airport; nor do we have one for the apparent decrease for those far away. Second, there is no meaningful definition of "neighborhood" nor standardization of various types of neighborhoods. One is not quite sure that each respondent is referring to the same idea when asked to rate the area in which he lives.

All of these problems, and others, make these data of dubious analytic utility. We feel that attitudes about the neighborhood, when measured in the manner explained above, contribute little to the understanding of response to the sonic boom.

(D) Summary of Results--Before and During SR-71 Flights. In general, when respondents are asked their feelings about the boom in a loose, unstructured manner, the answer is most often negative. This occurs both before and after SR-71 flights.

When asked precise, to-the-point questions, the answer is bound up with exposure to subsonic aircraft noise. Annoyance with the boom is relatively weak. However, it is greater farther away from the airport during the flights. People exposed to subsonic aircraft noise are less prone to choose the sonic boom as the most annoying sound in the neighborhood. Perhaps they feel that the boom is only temporary while subsonic noise is more enduring. Startle and resultant annoyance, although not widespread among these respondents, also depend upon exposure to subsonic aircraft noise. Those near the airport definitely show much more startle and annoyance. Those far from the airport are startled very little and are little annoyed. One concludes that the boom which these people experienced was not overpowering. We also conclude that those near the airport are either more sensitive to startle or they are reacting to both types of noise.

The sonic boom is best studied when placed in the context of other neighborhood sounds. From this we see that the boom is subordinate to subsonic aircraft noise only for those living near the airport. Those living far enough away not to be affected by the airport's operations do not subordinate the boom to anything--in fact, it becomes the number one source of annoyance.

Five Months After SR-71 Flights

(A) Sample. Approximately five months after the cessation of SR-71 flights (see Table I) additional interviews were gathered in the Los Angeles area for Phase II of the sonic boom study. The sample for this phase was not an area probability sample. Lists of persons who had registered formal complaints against the sonic boom were obtained and sampled systematically. For each complainant interviewed one or more neighbors were also interviewed. In addition, a number of residents who had been interviewed during Phase I were located and reinterviewed.

(B) Method. The method of analysis is similar to that used in earlier sections. The sample was divided into those near the airport and those far from the airport on the same criteria as the combined data analyzed earlier. In addition to the "Near" and "Far" categories, the labels "complainant" and "noncomplainant" are used. Complainants are those members of the interviewed sample who had registered a formal complaint² against the boom. Noncomplainants are all other respondents and include persons living in the same areas as complainants plus persons who had been interviewed during both Phase I and Phase II of the study. Table X shows the base numbers for a cross-classification of these two major groups.

The analysis will concern itself with percentage differences between combinations of the two major analytic categories. These combinations produce four groups: complainants near the airport, complainants far from the airport, noncomplainants near the airport, and noncomplainants far from the airport. Specific items considered in the analysis are the extent of objection to the boom, which sound in the neighborhood the respondent would like to eliminate first, the respondent's negative attitudinal position³ regarding the boom, the extent of disturbance of everyday activities, and ratings of various neighborhood qualities. These items are generally in the same areas as those analyzed earlier. We again expect that one's attitudes toward sonic booms will affect one's general outlook on the neighborhood.

²A complainant was either someone who had telephoned and objected to a boom or someone who had filed a damage claim.

³The negative attitudinal position of a respondent is determined by a negative adjective index which measures the number of negative adjectives the respondent uses when describing the boom. See Chapter III of "Public Reactions to Sonic Booms" for a more complete description of this variable.

Table X
GEOGRAPHICAL DISTRIBUTION OF SONIC BOOM PHASE II
SAMPLE IN NUMBERS

| | COMPLAINANTS | NONCOMPLAINANTS | |
|-------|--------------|-----------------|-----|
| Near | 46 | 137 | 183 |
| Far | 161 | 193 | 354 |
| Total | 207 | 330 | 537 |

Since the interview schedules used during the Phase I studies are incompatible with the schedule used during Phase II, no direct comparisons can be made between the results obtained from the two periods.

(C) Results. The results which follow show that there is little statistical difference between complainants whether they live near or far from the airport. Although statistical significance is not reached for data related to this group, there are differences in percents and these differences are definitely patterned. The data for noncomplainants, on the other hand, are quite often statistically significant. The percentage differences for this group also show definite patterns. These patterns are explicated below.

(1) Attitudes Toward the Boom. Table XI shows the extent of objection to the boom. All respondents in this table were first asked: "Have you formed any definite opinions about sonic booms?" If they answered affirmatively, they were then asked: "Do you object to sonic booms?" Quite obviously complainants object to the boom much more than noncomplainants. A majority of the noncomplainants are either undecided or do not object. Among complainants, those near the airport object somewhat more than those far from the airport. This relationship is stronger for noncomplainants. Also, noncomplainants tend to be more undecided about the boom than complainants.

Table XI
OBJECTION TO BOOM
(In Percent)

| | COMPLAINANTS | | NONCOMPLAINANTS | |
|-------------------------|--------------|-------|-----------------|-------|
| | Near | Far | Near | Far |
| Yes | 77 | 74 | 48 | 41 |
| Undecided | 3 | 3 | 17 | 8 |
| No | 20 | 23 | 5 | 51 |
| (Number of Respondents) | (30) | (112) | (113) | (116) |

When asked which sound in the neighborhood they would like to eliminate first, a majority of the respondents nominated something other than the boom, as shown in Table XII. However, the strength of the majority is different for complainants and noncomplainants. Complainants tend to nominate the boom four to five times more than noncomplainants. One other feature of the table is worth noting: Those far from the airport chose the boom as the first sound they would like eliminated much more than those near the airport. This demonstrates the salience of the aircraft noise problem for those living near the airport.

Another measure of the respondent's general attitude toward the boom is the adjective index, which measures how negative is the respondent's description of the boom. Table XIII shows the distribution of scores on this index. Zero is the least negative; three is the most negative.

In this table the main difference is between those near and far from the airport rather than between complainants and noncomplainants. Those near the airport use more negative adjectives to describe the boom than those far from the airport. Actually, the distribution for complainants far from the airport is quite similar to that for noncomplainants near the airport.

Table XII
FIRST SOUND TO ELIMINATE--BOOM
(In Percent)

| | COMPLAINANTS | | NONCOMPLAINANTS | |
|-------------------------|--------------|-------|-----------------|-------|
| | Near | Far | Near | Far |
| Boom | 34 | 46 | 7 | 13 |
| Other | 63 | 54 | 93 | 87 |
| (Number of Respondents) | (46) | (161) | (137) | (193) |

Table XIII
NEGATIVE ATTITUDE POSITION
(In Percent)

| | COMPLAINANTS | | NONCOMPLAINANTS | |
|-------------------------|--------------|-------|-----------------|-------|
| | Near | Far | Near | Far |
| 0 | 11 | 11 | 14 | 21 |
| 1 | 15 | 24 | 20 | 30 |
| 2 | 41 | 36 | 37 | 29 |
| 3 | 33 | 29 | 30 | 21 |
| (Number of Respondents) | (46) | (161) | (137) | (193) |

These three tables (XI, XII, and XIII) show that complainants dislike the boom more than noncomplainants and that those near the airport express negative attitudes toward the boom more than those far away. However, when it comes to deciding which sound they would like to eliminate first, those near the airport invariably choose something other than the boom. We would attribute this to the pervasiveness of the subsonic aircraft noise problem. Table XIV shows that this is indeed true. For both groups those near the airport nominate aircraft first much more than those far away. Of the noncomplainant group about ten times as large a percentage nominate subsonic aircraft noise. Table XIV also shows that of those near the airport, over twice as many noncomplainants nominate subsonic aircraft noise as do complainants (29 vs 13 percent). Far from the airport, complainants and noncomplainants are similar with respect to subsonic aircraft noise.

(2) Activities Disturbed. Part of the interview schedule for Phase II of the sonic boom study determined the reported disturbance of various everyday activities. The question was asked in the following manner: "Does the sound interfere with any of the following activities?" ("The sound" referred to the sonic boom.) The respondent was then read a list of activities and answered "yes" or "no." Since the SR-71 flights had ended five months earlier, the respondent was asked to react to the sonic boom environment as it existed during the interviewing period.

Table XIV

FIRST SOUND TO ELIMINATE--SUBSONIC AIRCRAFT NOISE

(In Percent)

| | COMPLAINANTS | | NONCOMPLAINANTS | |
|-------------------------|--------------|-------|-----------------|------|
| | Near | Far | Near | Far |
| Subsonic Aircraft | 13 | 4 | 29 | 3 |
| Other | 87 | 96 | 71 | 97 |
| (Number of Respondents) | (46) | (161) | •(137) | (46) |

Table XV shows the amount of disturbance of activities. Complainants report more disturbance than do non-complainants. Among complainants there is little difference between those near or far from the airport. Among noncomplainants those near the airport are more disturbed than those far from the airport.

Since all respondents are reacting to the "normal" sonic boom environment, the complainants must be more "sensitized" to the boom. Those who are not "sensitized" by having filed a complaint are made so by being near the airport, but to a lesser extent than complainants.

Table XV

PERCENT REPORTING "YES" TO
ACTIVITIES DISTURBED BY THE BOOM

| | COMPLAINANTS | | NONCOMPLAINANTS | |
|-----------------------------------|--------------|---------|-----------------|---------|
| | Near | Far | Near | Far |
| Resting Inside | 62 | 64 | 48 | 36 |
| Resting Outside | 55 | 51 | 44 | 29 |
| Sleeping | 33 | 41 | 31 | 17 |
| Phone | 31 | 40 | 39 | 21 |
| Listening to Records / Tapes | 48 | 40 | 41 | 21 |
| TV / Radio Reception | 55 | 42 | 40 | 20 |
| Reading | 52 | 63 | 50 | 33 |
| Eating | 24 | 33 | 19 | 15 |
| Range in Number of Respondents | 42 | 147-152 | 130-132 | 178-180 |

(D) Summary of Results--Five Months Afterwards. Complainants are much more annoyed by the boom than are noncomplainants. The former object more, choose the boom as the first sound to eliminate more, report more disturbance of activities, and are slightly more negative in describing it than the latter.

The influence of subsonic aircraft noise has not subsided. Those near the airport object more to the boom, are more negative in describing it, and report more disturbance of activities (noncomplainants especially). However, in spite of these attitudes toward the sonic boom, those near the airport do not choose it as the first sound to eliminate. The trend, of course, is to choose subsonic aircraft noise. Those not subject to subsonic aircraft noise tend to choose the sonic boom.

PART II: THE EFFECT OF NEIGHBORHOOD ENVIRONMENT

One of the problems with analyzing data collected on individuals is determining what effect the social or physical environment has on individual responses. For example, the situation could exist where a person's negative attitude toward the boom depends upon the pervasiveness of negative attitudes throughout his neighborhood. Through some form of social interaction, an individual's attitudes are modified by the prevailing attitudinal "climate." This is one situation where the attitudes of the group are important in understanding attitudes of the individual.

In our previous report on public reaction to sonic booms, this type of analysis was not considered. One reason was that this type of data had not been collected. It is felt that the types of group data relevant to response to sonic booms are: (1) the effects of urbanization, (2) the effects of other environmental noise, (3) the extent of neighborhood cohesiveness, and (4) the "climate" of complaint in the neighborhood.

Sample

Interviews conducted for Phase II of the sonic boom study (see Table I) constitute the base data for this analysis. The total number of interviews is 1,019, collected in four cities (Atlanta, Dallas, Denver, and Los Angeles). The details of the sampling procedures are presented in the previously mentioned report on public reactions to sonic booms.

Variables

The group data collected especially for this analysis relates mostly to census tract data. For convenience, the census tract is used as the boundary of the neighborhood. Each respondent was given a special code which represented the particular census tract in which he lived. Respondents were then grouped by census tract.

One main characteristic of the large, metropolitan areas in which the study was conducted is the increasing scale of urbanization. Urbanization reflects a style of life which is basically different from the traditional, rural life. It is typically associated with the city and is connected with basic changes in the structure of the family and changes in the population of neighborhoods. Usually the family becomes dependent upon extra-familial sources for most of its needs. The usual results are smaller families and more working women. As more heterogeneous people migrate to urban areas, a type of segregation develops which tends to isolate minority groups. Some

areas are inhabited by mostly majority group members; other areas have mostly minority group members.

Urbanization is measured by three separate indicators: Population Per Household (family size), the Percent of Women in the Labor Force, and the Percent White. All three measures are found in census tract statistics for each city.

One of the major sources of ambient noise in urbanized areas is automobile and truck traffic. Usually there is a wide variation in the ambient levels in any metropolitan area. Near the center of the city, or near major arteries, ambient noise is high; in the suburban areas, levels are lower. These differences in ambient noise environments may affect attitudes toward other sources of noise. For this analysis, a special "traffic index" was developed in order to measure the amount of noise produced by automobiles and trucks.

Neighborhood cohesiveness may play a role in the formation of an individual's attitudes. Where the neighborhood is highly cohesive, the probability is high that what others think is important to the individual. Conversely, where cohesiveness is low, the probability is low that the individual's attitudes can be influenced by his neighbors.

Two indicators of neighborhood cohesiveness are used: the residential stability, and the extent of home ownership in an area. Residential stability is determined by the percentage of respondents who have lived in the same house for five years. Home ownership is determined by the percentage of single-family dwelling units. Both indicators are found in census tract statistics.

The data for determining the "climate" of complaint were developed especially for this analysis. Census tracts were grouped according to the number of complaints registered from each. Four categories of census tracts were developed: those with no complaints, those with one, those with two, and those with three or more. Since a census tract is usually a rather large area, more categories could not be developed. Each respondent was given a score which coincided with one of these four categories.

Analytic Procedure

The analysis which follows is a special type called "contextual" or "relational" analysis. For contextual analysis, data are collected on both the individual and group level for one variable. Another variable, the variable to be explained or the dependent variable is then examined for each value of the individual-measured data within the context of each category of

the group-measured data. Relational analysis is similar. The only difference is that data are collected on three different variables: two at the individual level and one at the group level. The two individual-measured variables are related to each other within categories of the group-measured variable.

The data are presented as in Figure 2. Points are established by determining mean values of the dependent variable (Negative Attitude) for each category of one individual-measured variable (Complainant/Noncomplainant) within categories of a group-measured variable (Population Per Household). In this figure, an example of relational analysis is presented since Complainant/Noncomplainant and Population Per Household are two different variables. Figure 8 gives an example of contextual analysis. Both the individual-measured and the group-measured variables refer to complaint.

For each figure with more than two points, trend lines are given in order to smooth out the data. These lines are least-squares lines but must be interpreted with caution since a tendency exists to smooth out the data too much. When a pattern established by the means suggests a nonlinear relationship, the trend lines should be ignored.

Another aspect of these figures is use of null categories. When there are no respondents in a particular category of the group-measured variable, this category will simply be skipped. No attempt at inserting missing data will be made.

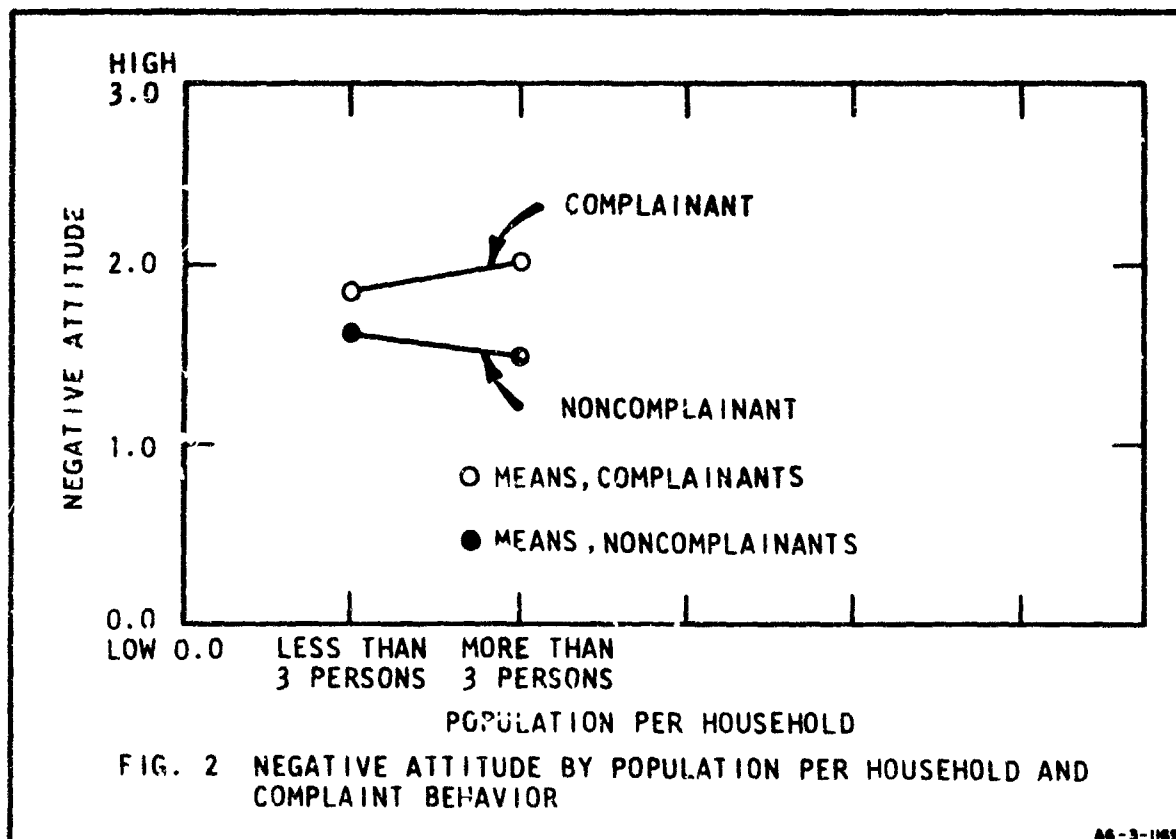
In each of the figures presented below, the variable of interest is the negative attitudinal position of the respondents as measured by the adjective index. Previous sections have dealt with this variable, and the main report describes it at length. No further comment will be made here.

Results

(A) Urbanization and Attitudes. Figures 2 through 4 show the effects of urbanization on complaint behavior and negative attitudes toward the boom. The effect of Population Per Household can be seen in Figure 2. As the size of the household increases, the negative attitude decreases for noncomplainants and increases for complainants. Although these differences need more research, they do suggest that the home environment acts differentially upon complainants and noncomplainants. More members in the family tend to increase the irritation felt with the boom for complainants, but to ease this irritation for noncomplainants.

Although better categories of population per household would have been desirable, the limited data also show that in

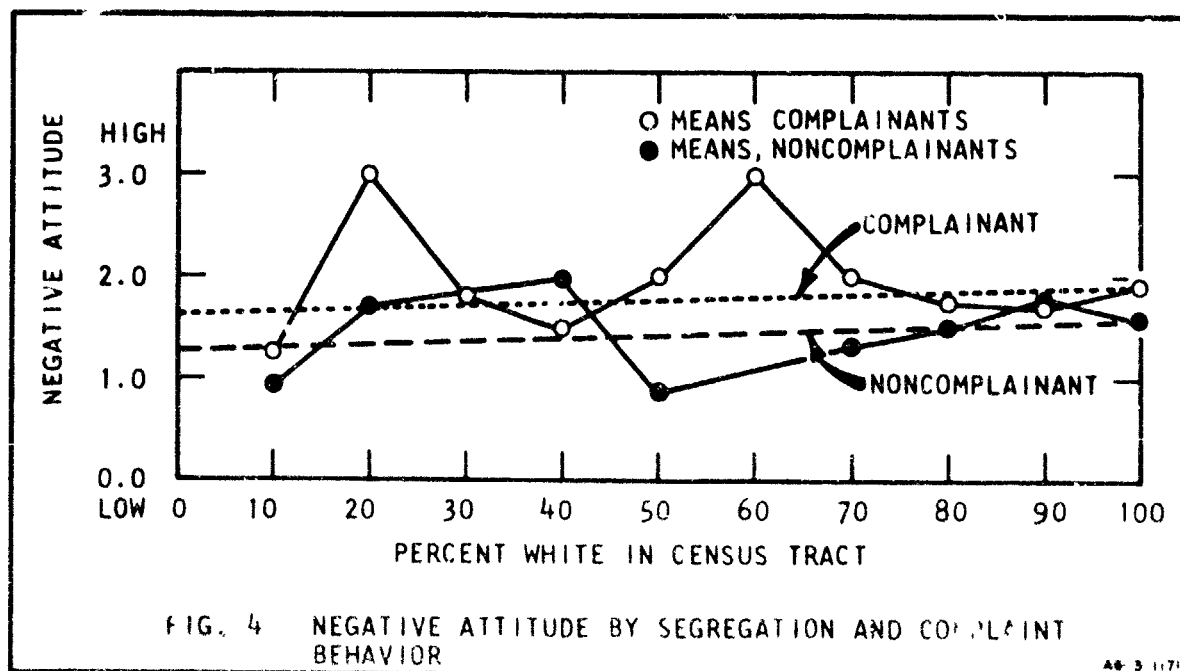
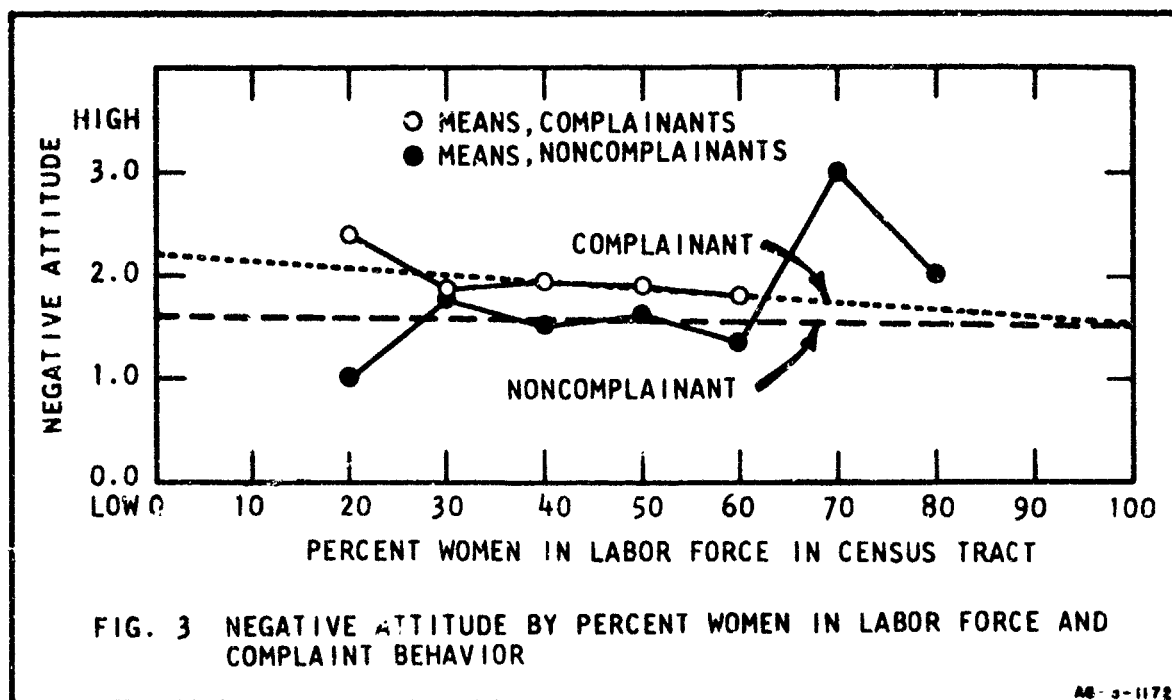
smaller households complainants and noncomplainants are more nearly alike in their negative attitudes. In the larger household, the difference between the two groups is wider. More data are needed to project the trend lines beyond the present categories.



In Figure 3 it appears that the number of working women in the census tracts of respondents for the study has no appreciable effect on attitude levels for noncomplainants. Negative attitudes remain moderately high, regardless of neighborhood type. For the complainants, however, the trend line declines as the percentage of working women increases. This suggests that in this measure of urbanization, negative attitude toward the boom is more intense in the home-centered environment than in situations where females have left home for employment.

In Figure 4 negative attitudes for complainants and non-complainants in ethnically integrated census tracts are shown. Census tracts are grouped according to the proportion of the population that is of Anglo origin. The trend lines show that there is a slight rise in negative attitudes as the proportion white increases. This relationship exists for both complainants

and noncomplainants. In fact, the lines are almost parallel, indicating a constant difference between the two groups, with complainants higher.



These three indicators show that there is some effect of urbanization on attitudes toward the boom. Two of the indicators, Population Per Household and Percent Women in the Labor Force, suggest that increasing urbanization has the effect of reducing negative attitudes toward the boom for complainants. In smaller households, and in areas where the percent of working women is high, attitudes of complainants are less intense than in larger households and areas where the percent of working women is low. Attitudes of noncomplainants are either not affected or made similar to complainants' attitudes. The third indicator, Percent White, shows that increasing isolation has the effect of increasing negative attitudes toward the boom for complainants and noncomplainants alike.

(B) Noise Environment and Attitudes. Due to the difficulty and expense of obtaining objective noise measurements in each neighborhood for an extended period of time, the analysis will use estimates of traffic noise--the major noise source in residential areas. Based on traffic-count statistics made available by the city planning departments of Los Angeles, Denver, Dallas, and Atlanta, each respondent in the sonic boom study was first categorized according to his proximity to major and secondary arteries and collector streets.

This was accomplished by use of updated city planning department maps showing both the locations of the latest traffic counts and the counts themselves. Census tract outlines were then transferred from census maps onto the traffic maps. For those cities that could not furnish maps showing the location of the traffic counts, traffic readings and the census tract outlines were imposed on street maps.

Once traffic counts and census tracts had been plotted on the maps, the total number of readings was determined for each tract (e.g., every reading falling within or along the boundaries of each census tract was recorded).

An average reading was calculated for each tract. Since all the scores were given in thousands, each score was then divided by 1,000 for readability and data manipulation.

The information (traffic index) was then assigned to individual respondents. Each respondent was assigned the score of the respective census tract in which he resided. A frequency count of respondents falling within categories of the traffic index was then conducted. It was decided that dividing the traffic index into 10 categories would facilitate handling. Since there were 875 respondents for whom data could be calculated, each category was to have approximately 87 individuals. The division, based on the frequency distribution, resulted in the following:

Table XVI
DISTRIBUTION OF TRAFFIC COUNTS

| Category | Traffic Index Range* | Number of Respondents |
|----------|----------------------|-----------------------|
| 1 | 0 - 0 | 80 |
| 2 | 0.1 - 6.2 | 82 |
| 3 | 6.3 - 8.2 | 84 |
| 4 | 8.3 - 10.2 | 86 |
| 5 | 10.3 - 12.1 | 89 |
| 6 | 12.2 - 13.9 | 97 |
| 7 | 14.0 - 16.7 | 76 |
| 8 | 16.8 - 20.7 | 98 |
| 9 | 20.8 - 25.6 | 85 |
| 10 | 25.7 - 240.8 | 98 |

*The figures are shown in thousandths and represent average number of vehicles per 24-hour period, based on 1968 records.

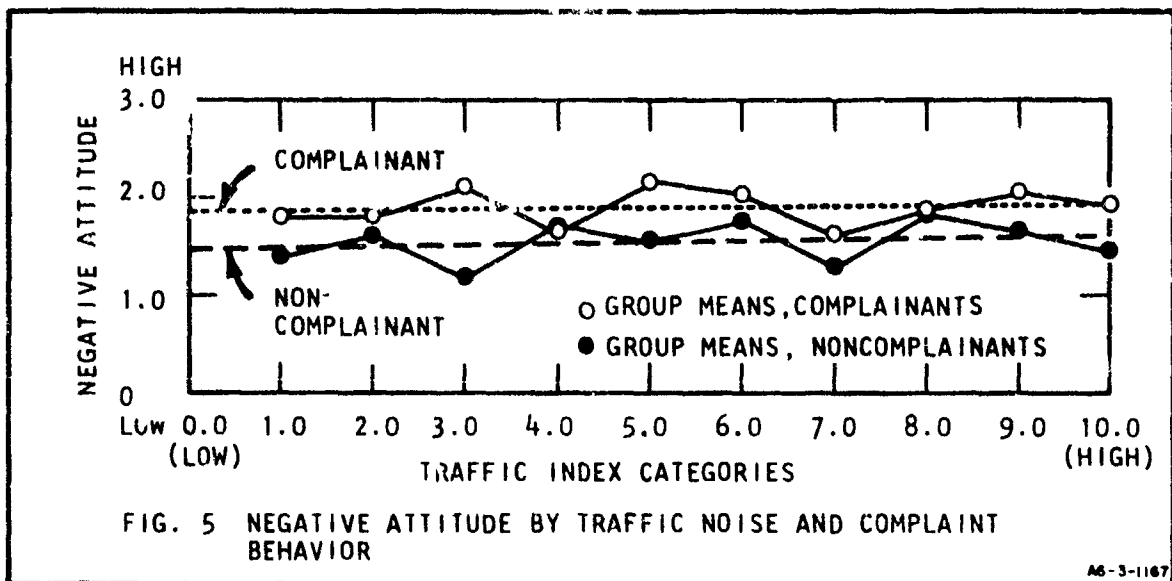
The abscissa of Figure 5 shows the 10-category traffic index for census tracts in which respondents were located. The adjective index score (negative attitude position) for complainants and noncomplainants was plotted along the ordinate.

As can be seen, trend lines for complainants and noncomplainants remain (1) parallel, and (2) nearly flat, indicating the following:

(1) Negative attitude for complainants is higher than for noncomplainants at all levels of traffic noise.

(2) The noisiness of neighborhood surroundings, as indicated by traffic counts, has no effect on attitude toward the sonic boom.

It can be concluded from Figure 5 that individuals who complain about the sonic boom have a stronger negative attitude than those who do not complain across all categories of traffic noise exposure, and that these reactions to the boom are clearly not due to the effects of traffic noise.



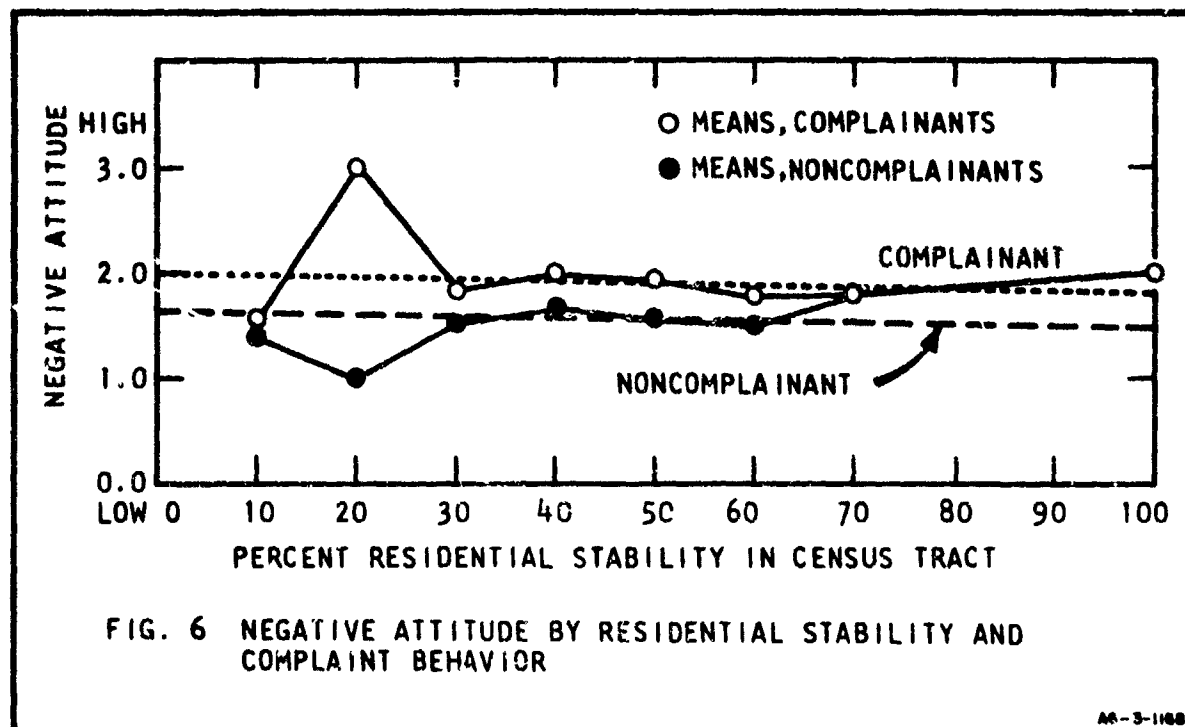
(C) Neighborhood Cohesiveness. In our report, "Public Reactions to Sonic Booms," it was shown that several aspects of home ownership were salient predictors of negative attitudes. It was felt that longevity in a neighborhood and pride of home ownership are characteristics of persons who expect their neighborhoods to be quiet, peaceful areas in which to raise families.

From these findings, it can be hypothesized that more intense negative attitudes to the boom would be experienced in neighborhoods with a high proportion of single-family homes than would be the case in other areas, and that families in neighborhoods with low turnover in occupancy would be more aggravated by noise pollution, including sonic booms, than would be the case for short-term residents.

Figures 6 and 7 examine these propositions. In Figure 6 neighborhoods of the respondents are ranked along the horizontal axis according to degree of residential stability. Census tracts in which only 10 percent of the population had lived in present residences for five years or more are in the first category. Tracts in which 100 percent of the population had lived there for five years or more are at the right. Tracts with intermediate proportions of turnover are categorized between the two extremes.

The trend lines for complainants and noncomplainants in these tracts decrease slightly, indicating that residents in the more stable neighborhoods have a somewhat weaker negative

attitude toward the sonic boom than did residents of high turnover neighborhoods. This, of course, is the opposite of what we expected.

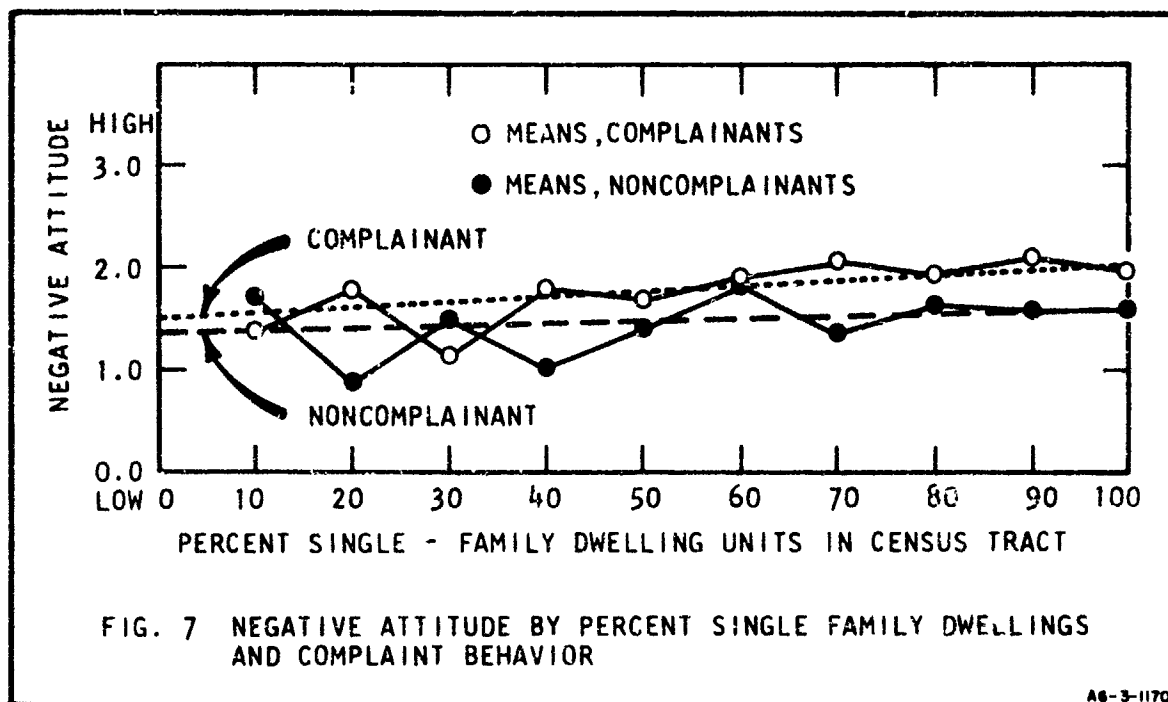


It can also be noted in Figure 6 that the distance between the two trend lines remains constant, suggesting a uniform difference on negative attitudes between complainants and noncomplainants.

The second measure of neighborhood cohesiveness, the proportion of single-family dwellings in the tracts in which respondents lived, could also be expected to correlate positively with negative attitude toward sonic booms.

It should be expected that neighborhoods zoned for single-family residences would include more home owners rather than renters, and that these areas would be expected to be less noisy than areas zoned for apartments or commerce.

It might be postulated, therefore, that negative attitudes for complainants and noncomplainants would increase as the proportion of single-family dwellings increases. This proposition is supported in Figure 7.



A slight increase in negative attitude occurs as the proportion of single-family dwellings increases in the census tracts studied, indicating an effect in the expected direction. The fact that the lines tend to diverge indicates the effect is stronger for complainants than for noncomplainants.

The findings presented in Figures 6 and 7 suggest two conclusions:

- (1) Negative attitudes are stronger in neighborhoods in which there is high residential mobility and thus less stability.
- (2) Negative attitudes are stronger in neighborhoods characterized by home ownership--especially for complainants.

These conclusions force us to re-evaluate the effects of neighborhood cohesiveness. It is quite evident that its effects are not simple. Negative attitudes would be strongest in areas characterized by a high level of home ownership but also a high level of instability. Conversely, negative attitudes would be weakest in areas characterized by a low level of home ownership and a low level of instability. It remains for future research to decide whether an unstable, low home-ownership area is more negative than a stable, high home-ownership area.

(D) Neighborhood Context of Attitude and Complaint. It is of interest to explore the matter of whether the number of complainants per unit of neighborhood affects the attitude of the neighborhood. This effect is shown in Figure 8. Complainants display a high, constant negative attitude toward the sonic boom regardless of the number of complaints in the neighborhood. For the noncomplainant who is surrounded by neighbors with strong negative attitudes and who register complaints, the greater is the likelihood of an increase in his own negative attitude. This is evident by noting the rise in the slope of the regression line for noncomplainants. In census tracts where only one complainant is registered, the negative attitudinal position for the noncomplainant is definitely less than that of the complainant, but as the number of complainants increases, to three or more per census tract, the attitudinal position for the noncomplainants rises to very nearly the same high level as for complainants. This phenomenon illustrates the effects of social context on one's own attitude.

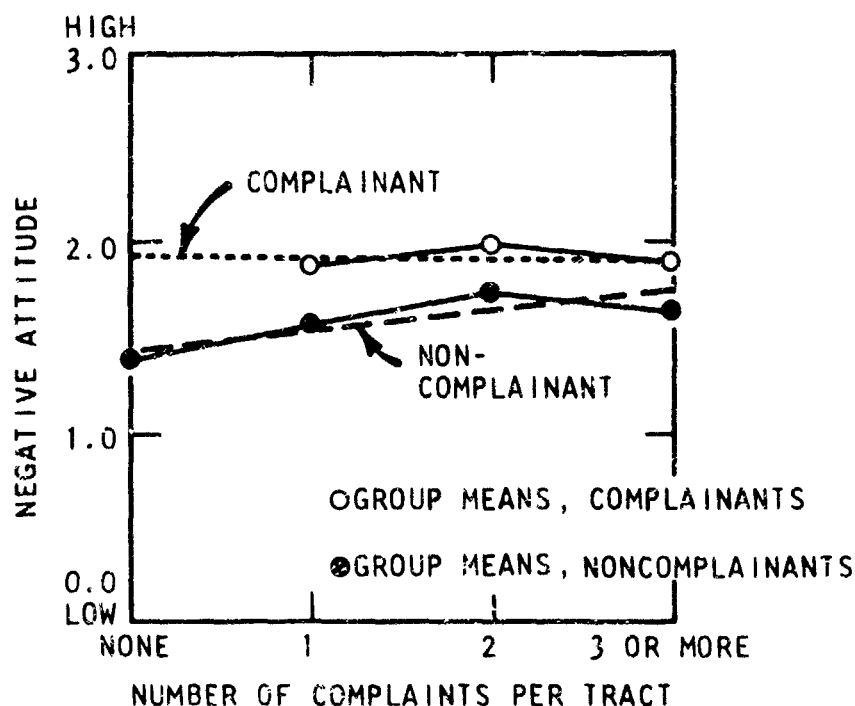


FIG. 8 NEGATIVE ATTITUDE BY NEIGHBORHOOD CONTEXT AND COMPLAINT BEHAVIOR

AG-3-1185

Summary--The Context of Attitudes toward the Boom

This analysis shows that the respondents' negative attitudes toward the boom are affected by the extent of urbanization, the type of cohesiveness found in the neighborhood, and the "climate" of complaint in an area, but not by the amount of environmental traffic noise. These effects are especially strong on complainants. The results are summarized as follows:

- (1) The effects of urbanization operate differentially:
 - (a) Complainant negative attitudes toward the boom increase as family size increases, as the proportion of working women decreases, and as the extent of social isolation increases.
 - (b) Noncomplainant negative attitudes toward the boom decrease as family size increases, are not affected by the proportion of working women, and increase as the extent of social isolation increases.
- (2) Traffic noise has no effect on negative attitudes toward the boom.
- (3) Negative attitudes toward the boom increase as the residential stability of an area decrease
- (4) Negative attitudes toward the boom increase as the extent of home ownership increases--especially for complainants.
- (5) No effect on attitudes toward the boom is found among complainants as the number of complaints in an area increases.
- (6) Negative attitudes of noncomplainants toward the boom increase as the number of complaints in an area increases.

CONCLUSIONS

Subjective response to the boom is dependent upon the environmental context in which it is experienced. Areas where there is regular exposure to subsonic aircraft noise definitely show less severe response than areas where there is not regular exposure.

This conclusion suggests that the subjective response to the boom could be subordinated to other environmental conditions. It could be that people who have other, more pressing problems, such as poverty, crime, or other forms of social disorganization, simply do not consider the boom important. More information on this is certainly needed before generalizations of this sort can be made. The specific type of information needed is the respondent's perspective with regard to the sonic boom. These data would have the respondent judge the relative importance of problems in his life and then have him locate the sonic boom with respect to these problems. In this manner, the relative importance or salience of the sonic boom could be ascertained.

Evidence has been presented suggesting that negative attitudinal reactions to the sonic boom are affected by the social environment. Respondents react, albeit differentially, to the effects of urbanization. Attitudes vary depending upon the stability of an area or the prevalence of home ownership. People who have not complained are affected by the "climate" of complaint in their neighborhoods.

We would postulate that a greater dichotomization would be found between complainants and noncomplainants in less urbanized areas. Complainants should be more intensely negative, while noncomplainants should be less so. This would be particularly true if the less urbanized area had high rates of home ownership. However, if the residential stability of the area were high, a counter-trend of decreased negativity would exist.

The fact that the attitudes of complainants are not affected by the number of complaints in the area, whereas those of noncomplainants are, suggests that negative attitudes reach some sort of peak which coincides with complaining. In other words, complainants have made up their minds; having others in the neighborhood who could care less about the boom does not alter their position. People who have not complained, however, are influenced by those who have--either directly or indirectly.

Finally, the fact that traffic noise has no effect on attitudes toward the sonic boom points out the uniqueness of the boom in the experiences of the respondent. The boom is not merely catalogued with other sources of environmental noises;

however, Part I showed it was connected to subsonic aircraft noise in relation to disturbance and annoyance.